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August 12, 2002

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Susan Nachtrieb
Permits Unit Manager
Water Quality Control Division
Colo. Dept. of Public Health & Environment
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Subject: Comments on the Draft Water Quality Assessment for the St. Louis Ponds

Dear Ms. Nachtrieb:

Atlantic Richfield Company (Atlantic Richfield) appreciates the opportunity to review the draft Water Quality Assessment (WQA) developed by the Water Quality Control Division's (WQCD) contractor. This letter and attachment document our comments on the draft WQA and suggests an alternate approach to some aspects of the draft WQA that we hope will benefit the WQCD's analysis. We appreciate the time that you have given to this project and hope that these comments will lead to an improved WQA. Our comments are based on our review of the Division's analysis and the results of the two meetings with the WQCD, and are consistent with the appropriate State Water Quality Regulations.

We have identified the following key issues for your consideration:

1) The use of a TMDL type approach to establishing water quality effluent limits has not been justified. Existing water quality has not been compared to water quality standards to show water quality deficiencies warranting use of TMDL analysis.
2) The TMDL type approach was coupled with the inclusion of the existing adits and seeps as point sources for which conservative, excessive WLA's were developed. This has resulted in an overstatement of the true impact of the minor seeps and adits and an imposition of unrealistic requirements at the St. Louis system.
3) As part of the TMDL type approach used for calculating effluent limits, waste load allocations for the minor inputs to the stream were developed using average flows for the sites concurrent with low river flows; such an assumption is inconsistent with available data and if the WLA approach is followed, it should be modified to reflect the seasonality of the various sites.
4) Antidegradation requirements should not apply at the Rico sites since the discharges already exist and will only be improved as a result of any treatment implemented.
5) The draft WQA and letter prepared by the WQCD identified issues with zinc. No data or calculations were provided that support a conclusion that zinc is a water quality problem. The zinc loadings presented in the State's cover letter were unsupported by calculations. No exceedences of zinc standards in the Dolores River could be identified based on available data.

We recommend the following:

1) WLA's for the St Louis system may be based on a simple mass balance at the pond discharge, the background concentration in the Dolores River, and the stream standards.
2) If WLA's for the various loadings to the Dolores River are determined,
    a. The loading of Silver Creek at the confluence to the Dolores River should be used to represent all of the Silver Creek contributions.
    b. Minor sites along the Dolores River should be based on actual flow and loading during low flow conditions. Flows and samples collected this July during a low-flow drought condition could be used as an indication of this condition. Additional samples over the next year could be collected to expand the database.

Attachment No 1 provides more detail on the concerns with the Draft WQA and our recommendations to resolve these concerns.

Thank you for the opportunity to review the draft WQA. We are available to discuss our comments at your convenience, the results of the recent data collection activity at the site and the next steps for development of the WQA.

Sincerely,

William R Kelly

for Chuck Stilwell, P.E.
Environmental Manager

Cc: Lee Hanley (EPA)
Eric Heil (Rico)
Robin Bullock (Atlantic Richfield)
Alan Au (BP America)
Bill Kelly (SEH)
Pat Nelson (CH2M HILL)
Bill Duffy (DGS)
Marcus Martin (NL)
Sheldon Muller (EPA)
Tony Trumbly (Colorado Attorney Generals Office)

ATTACHMENT NO 1

COMMENTS ON THE DRAFT WATER QUALITY ASSESSMENT FOR THE ST LOUIS PONDS

General

Atlantic Richfield has several significant concerns with the draft WQA that was developed by the WQCD. Our concerns are applicable to both scenarios developed by the WQCD. The scenarios that were developed by the WQCD are: 1) the St. Louis Ponds are hydrologically connected to the Dolores River and the Blaine Adit has a discharge to Silver Creek, and 2) there is no hydrologic connection between the St. Louis Pond system and the Dolores River and the Blaine Adit does not discharge to Silver Creek or any other tributary.

We have informed the WQCD that the Blaine Adit discharge to Silver Creek has been eliminated. Our understanding was that, with the Blaine Adit eliminated, the WQCD would complete the analysis assuming 1) hydrologic connection, and 2) no hydrologic connection, both without discharge from the Blaine Adit. Recent field observation confirms that the Blaine Adit is not discharging. Our analysis and that presented in the WQA suggests that the assumption of a hydrologic connection between the streams and the ponds does not appear to significantly impact the effluent limitations that would be imposed for the St. Louis Ponds discharge. We understand that the WQCD has acknowledged this situation. Therefore, we suggest that further WQA assessment be based on a scenario of no discharge from the Blaine Adit and recognition of the minimal impact from a hydrologic connection to the ponds.

We further understand that the WQCD's WQA computed both effluent limits and antidegradation values for the St. Louis Pond discharge as well as for the discharges from the Blaine Adit, Argentine Seep, Columbia Tailings Seep, Rico Boy Adit, Santa Cruz Adit and Silver Swan Adit. Atlantic Richfield has requested development of limits for only the St Louis Pond discharge and provides further justification for this below. The comments regarding the WQA and development of the effluent limits and antidegradation values are summarized as follows:

1. Qualification for TMDL Analysis

The WQA document and associated spreadsheets reference the development of a Total Maximum Daily Load (TMDL). Yet, the WQA does not evaluate the actual water quality downstream of the influences of the St. Louis Pond system and the historic seeps and adits, as required in the WQCD's approved TMDL methodology to determine if a stream qualifies for the TMDL process. Also, it does not compare the existing quality to the water quality standards for these segments. According to the WQCD TMDL methodology, TMDL analysis is performed when a stream is shown to exceed the water quality standards. No justification was included in the WQA as to the need to evaluate the entire drainage and perform a TMDL analysis. Regulation 31, The Basic Standards and Methodologies For Surface Water (5 CCR

1002-31), states that TMDLs will be developed for water quality-limited segments. A water quality-limited segment is one where no assimilative capacity exists. The St. Louis Pond discharge and discharges from the other historically draining adits and seeps included in the assessment existed prior to the Clean Water Act in 1972. Thus their impact on the Dolores River is not new and is reflected in the current water quality of the Dolores River. The St. Louis Ponds have discharged uncontrolled since the mid 1990s, and the WQCD has not identified these segments on the 1996, 1998 or draft 2000 CWA Section 303(d) lists. The WQCD renewed the permit for the discharge from the St. Louis Ponds several times. As part of the renewal process, the WQCD reviewed the ambient water quality. During the drafting of the permit renewals no determination was made that the water quality standards were being violated or that effluent limitations need to account for other point sources. The WQA does not evaluate the actual water quality downstream of the influences of the St. Louis Pond system and the historic seeps and adits, and does not determine if the water quality standards for these segments are being exceeded.

We understand that since the development of the WQA, the WQCD has changed their approach in using the term TMDL in this WQA. It was suggested that the term "assimilative capacity" replace "TMDL". This change seems to support that a TMDL is not warranted for these segments. This change addresses part of our comments, but there still is the question of including historic adits and seeps in addition to the St. Louis Ponds discharge as point sources and developing permit limitations also called "Waste Load Allocations"(WLAs) for them.

It is recommended that the effluent limitations for the St. Louis Ponds be computed based on a simple mass balance calculation consistent with both past permit calculations and the antidegradaton analysis completed as part of this WQA. The WQCD has offered no rationale for not using a simple mass balance approach and instead electing to follow a modified TMDL type analysis treating downstream loading as equivalent to permitted point source discharges. In lieu of this, it is recommended that the WQCD first determine if current water quality conditions support development of TMDLs (i.e., violations to Water Quality Standards must exist). With the low flow condition occurring this summer, it may be appropriate to use direct in-stream measurements that were taken in July this year to assess base flow water quality in the Dolores River.

2. Adits and Seeps as Point Discharges

There are two main issues related to adits and seeps: a) whether their inclusion as point sources is appropriate; and b) how their flows and loadings are calculated. The WQCD took the approach in the WQA of treating the historically draining adits and seeps as point sources and developed permit limits (WLAs) for each discharge. (This includes the Blaine Adit, which has been plugged and is appropriately excluded from all analyses.) The WQCD has previously viewed such historic adits and seeps as non-point source discharges, which do not need WLAs; rather they have been considered as part of the background or load allocation. Load allocations are the amount of a pollutant assumed as background.

If the adits and seeps had been viewed as load allocations in determining the remaining assimilative capacity for the Dolores River, then the way to account for them would be to use the actual pollutant loading from those sources, calculated from direct measurements of those flows, not potential effluent limitations estimated using assumed flows and concentrations. Also, such loadings would need to consider the seasonal variation and the influence of precipitation events on the discharges from the adits and seeps.

As written, the WQA currently uses average flows from the draining adits and seeps to calculate WLAs and TMDLs for the Dolores River year round. However, the adits and seeps flow in response to seasonal precipitation variations, as well as droughts. Therefore, the influence these adits and seeps have on the water quality of the Dolores River will vary seasonally and should be evaluated on a seasonal or low flow basis.

Should the WQCD wish to perform an evaluation of the impacts of these sources on the Dolores River, the recommended procedure is to determine the loading from the sources that directly flow into the river during low flow conditions on a seasonal basis, the actual seasonal loading from Silver Creek, and the seasonal ambient loading above the St. Louis Ponds discharge. These loadings would then be subtracted from the total allowable loading calculated at a point downstream of the sources based on the low flow at that point and the water quality standard.

3. Determining Low-Flow of Stream

In addition to using the average flows of the adits and seeps for calculating WLAs and assimilative capacities, the WQA uses the annual average flows of the adits and seeps to determine the in-stream low flows. The WQA deducts these average flows from the low flows at the USGS gaging station located approximately 5 miles downstream of the Rico Mine area. Atlantic Richfield's concern with this approach is that comparable flow estimates are not being used. As stated under item 2, flows from adits and seeps vary significantly both seasonally and in response to wet and dry years. Since the adits and seeps respond to precipitation, during low flows they will discharge less than the average flow or not at all. Thus, the approach of combining in-stream low flows and average adit and seep flows overestimates the impact on the stream of the discharges from the adits and seeps. The recommended approach is to use data from low flow periods, or determine the relationship between the flows at the gaging station and the flows of the adits and seeps. The current approach does not take into account periods when the adits and seeps do not flow at all due to seasonal variation or lack of precipitation.

Atlantic Richfield conducted a review of the discharge flow data for the Rico Boy, Santa Cruz and Silver Swan adits and the flow data for the Dolores River. A comparative analysis was performed to determine whether a relationship existed between the adit flows and the low flow for the receiving stream. The analysis compared actual flow data from both adits and streams during four separate time periods where low flows in the stream were measured. The four low flow events occurred within the last 20 years. Actual adit flow-to-low stream flow ratios were determined. A second set of ratios was calculated of the historic average adit flows used by the WQCD and the calculated low flows for the streams. The WQCD calculated low flows at selected points in the Dolores River and Silver Creek by multiplying the monthly low flows measured at the USGS Gaging Station #09165000 by the ratio of watershed area draining to the point of interest and the watershed area of the USGS gaging station. The historic average adit flows were calculated by the WQCD as an average of all flow data, for each adit, collected from 1995 to the time the WQA was made. The rationale for averaging all of the historical data together instead of taking seasonal averages is not explained in the WQA.

The actual low flow ratios calculated by Atlantic Richfield were compared with the historic average adit flow-to-calculated low flow ratios used by the WQCD in the WQA to determine if there was a significant difference between the two ratios. The results of this comparison are shown in Table 1. The flow data compiled and drawn from to prepare these ratios are shown in Tables A-2 and A-5 of the Appendix.

TABLE 1
Comparison of Actual Low Flow Ratios with Method Used in the WQA

Location	Percent of stream Flow for the four low flow time periods[1]	Percent of Stream used in WQA[2]	WQA Over-estimation Factor
Rico Boy Adit Discharge	0.02%	0.14%	6.3
Santa Cruz Adit Discharge	0.14%	0.91%	6.4
Silver Swan Adit Discharge	0.40%	1.85%	4.7

[1] Based on paired flow data of the Dolores River (COSJDO03-2.5) and the Rico Boy, Santa Cruz and Silver Swan adits for the dates of 12/17/1980, 03/17/1983, 10/17/1995, and 04/15/1998.

[2] Based on the annual acute low flow for the Dolores River (COSJDO03-2.5) and the historic average flows for the Rico Boy, Santa Cruz and Silver Swan adits used in the WQA.

As shown in Table 1 above, the WQCD's method of using historic average flows for the adit discharges and the annual low flows of the stream resulted in an over-estimation when compared with ratios based on actual flows from the four low-flow events. For example Table 1 shows that during low flows the Rico Boy Adit makes up about 0.02% of the Dolores River, while the WQCD's method suggests that this adit makes up 0.14% of the flow. In other words, during low flow periods, the WQCD's flow computation method in the WQA overestimates the Rico Boy adit flow by a factor of 6.3. Thus, the WQCD's WQA significantly overestimates the influence of the adits' discharge on the Dolores River during low flow periods.

Insufficient data were available to compare the adit and seep flows discharging to Silver Creek with Silver Creek low flows. It is suspected that the WQA also significantly overestimates the influence of adits and seeps on Silver Creek during low flow periods.

Based on Atlantic Richfield's analysis, the influence of adit and seep flows on the receiving streams is much less than assumed by the WQCD. During low flow periods, adit and seep flows make up a smaller proportion of river or creek flows than suggested by the WQCD. Therefore, the impacts from these sources on the Dolores River during low flows are likely less than concluded in the WQA. To better refine the WQA, it would be necessary to perform a more detailed evaluation of the relationships between the adit flows and the low flow of the receiving stream. Data collected this year during a very low flow (drought) season should be considered for both adit and seep flows, as well as receiving stream flows. Atlantic Richfield would agree to additional seasonal flow/loading sampling to provide a more representative estimate of adit/seep loading before the WQCD ultimately determines how to address such loadings in the WQA.

4. Tributary Wetlands

The WQA takes the approach of assuming an in-stream low flow of zero for discharges to wetlands and unnamed tributaries. This results in the determination of the WLA based solely on the standard without any benefit of dilution from the receiving stream, as though the wetlands were a lake. This method would be appropriate for isolated wetlands with no other flow inputs, but there is no evidence this is the case. This method is not appropriate in this instance because the wetlands in this scenario are likely fed by the Dolores River and associated groundwater input from the riparian area. If it is assumed that the low flow of the wetlands is zero, that means that during low flows there is no connection between the river and the wetlands, therefore loadings from the sources do not impact the river and should not be included in the assessment.

It is suggested that if the WQCD assumes that the sources flow through the wetlands into the river, then there should be some accounting for filtering and removal of pollutants in the wetlands or the loading should be accounted for as a direct discharge into the stream. In addition, if the former is assumed, the dilution of the wetland discharge into the river should be accounted for in the calculations.

5. St. Louis Discharge Flows

In the WQA, the seasonal discharge flows used for the St. Louis Ponds in determining WLA were modified by the contractor to represent maximum monthly averages, rather than the flows provided by Atlantic Richfield. The flows provided by Atlantic Richfield are the design discharge rates for a possible future treatment facility and therefore would be the maximum monthly design flow that would ever be expected to be released to the river from the St. Louis Ponds during the seasons proposed. The contractor included an extra "safety factor" by increasing the "design" flows by 11% for the January through March season and 5% for the October through December season. Because permit limitations are based on a worst case scenario, an implied safety factor is already considered in the calculation of effluent limits. No additional factor is necessary. Therefore, the WQA calculations are based on conservatively large discharge flows.

The preferred method is to calculate the permit limitations on the flows proposed by Atlantic Richfield. It is recommended that WQCD redo the calculations based on these discharge flows.

6. Background Concentrations

The WLA for the adits and seeps is used in the calculation of the remaining assimilative capacity. Using the measured adit/seep discharge quality from the available data would provide a more realistic analysis of the remaining assimilative capacity and overall water quality in the Dolores River. Calculations of background load allocations are derived by WQCD, using average ambient water quality data with the low flow from a sampling point downstream of the source, minus the flows from upstream discharges and instream low flows. This method of calculating background loading deducts only the flow associated with upstream discharges not the loading from those discharges that is incorporated in the ambient water quality data. It thus implies that there is less assimilative capacity in the stream than actually available. Additionally, by using overall average ambient water quality data, the derived background loads do not take into account seasonal variation. The WLAs review completed by Atlantic Richfield used ambient water quality concentrations (background) that were averaged for the three separate seasons. The methods used in the WQA for the determinations of background load allocations and remaining assimilative capacity in the Dolores River and Silver Creek are not appropriate.

Based on our meetings with WQCD, it is our understanding that the contractor modified the equations in the spreadsheet because they encountered negative background concentrations for some parameters. Atlantic Richfield performed calculations to determine background inputs between Blaine Adit and the Argentine Seep and downstream of the Argentine Seep using the loads from the Blaine Adit and Argentine seep with the values developed by WQCD. This approach did not result in a usable background allocation; negative values were calculated. These negative values are an indication that the assumptions made are not appropriate. Negative values indicated that either the low flows or discharge flows used are not accurate or that the concentration values are not appropriate. In this instance, the negative values are likely due to limited flow and concentration data and using data that does not truly reflect what is occurring in the stream. A specific example is the Blaine Adit. A single data point, from 1999 was used for the flow. This was not a low-flow year, yet it was assumed that this discharge existed during low flows.

When loading due to this discharge was subtracted from down stream loading (which was based on a larger amount of data), a negative value for background resulted. This indicates that assumptions for the Blaine Adit are not appropriate.

As a result of the lack of data on Silver Creek, it does not seem reasonable to try to individually account for the discharges from the Blaine Adit and Argentine Seep and all background inputs for determining the remaining assimilative capacity in the Dolores River, but to look at the contribution from Silver Creek as a whole to the Dolores River. This approach is discussed in more detail later in this memo.

7. Hardness Values

The calculation of the water quality standards for those parameters subject to Table Value Standard (TVS) in the WQA were made using various hardness values that represent multiple locations along the Dolores River and Silver Creek. Therefore, multiple standards were derived for both the Dolores River and Silver Creek that were used to determine the TMDLs at multiple points and the WLA for the various discharges. In determining the water quality standards for a segment, the WQCD typically uses the average hardness for the segment as a whole. In addition, the hardness values used in the WQA do not always make technical sense because they are inconsistent between monitoring points. For example, in determining the water quality standard in Silver Creek a hardness value of 84 mg/l for the section of the stream between the Argentine Seep and the Blaine Adit was used. This value is less than the hardness of the discharge from Blaine Adit, 2087 mg/l and less than the hardness upstream of the Blaine Adit, 106 mg/l. The hardness downstream is unlikely to be less than the hardness measured at the discharge or upstream, especially if the Blaine Adit is impacting the stream. There were only two hardness values in the available data for this section of the creek, therefore it does not seem reasonable to make the conclusion that these hardness values are truly representative. The use of this low hardness value results in a WLA for the Blaine Adit that is overly conservative. In addition, the hardness values used were mean values of all the data, not the mean of the hardness data associated solely with low flow data. Based on our meeting of April 25, it appeared that the WQCD was willing to consider alternative approaches. Because of the seasonality of the discharges, use of the average of hardness data from low flow sampling is a more appropriate method.

However, the issue with the hardness value below the Blaine Adit is irrelevant if the WQCD and EPA agree that the Blaine Adit has been successfully plugged, or that it is more appropriate to look at the impact of Silver Creek as a whole on the Dolores River. The latter method would be more appropriate based on statements made by the WQCD that the stream below the Argentine seep changes in character and is of better water quality.

Where practical, the WQCD required method to determine the hardness value is to perform a regression analysis of all hardness data within the specified segment to determine the lower 95% confidence limit of the mean hardness value for that segment at the periodic low flow criteria. Where, as here, the hardness and flow data are insufficient to perform a regression analysis, then the recommended approach is to use mean hardness value for the segment for low flow periods using the available data within the specified segment.

8. Zinc Issues in Stream

The WQA states, "The findings of the assessment indicate that during times of low flow, there is a serious zinc water quality problem that results in the point source discharge contributions exceeding the stream's assimilative capacity for zinc by 31.6 lbs/day." This value equated to an exceedance of the assimilative capacity by 574 ug/l putting the stream at a concentration of zinc of 756 ug/l based on the low flow of 6.6 MGD. This conclusion (both the quantified 31.6 lbs./day and the statement "there is a serious zinc water quality problem") is not supported by the WQA or any actual available in-stream water quality data for the Dolores River. How this number was determined has not been explained to Atlantic Richfield. The maximum assimilative loading and point source contributions shown in Table A-2 of the WQA, implies that the water quality standard is being significantly violated and additional removals would be necessary from the St. Louis Ponds treatment system to meet the standards. However, using actual data, the ambient water quality in the Dolores River downstream of all the adits and seeps does not indicate a violation of the water quality standard or that there is a "serious zinc water quality problem" in the Dolores River. Additionally, actual data does not support there is a "serious problem" or violations to water quality standards in the Dolores River for any other constituents, where existing data is available. Table 2 compares the water quality standard (TVS based on a hardness of 166 mg/L) with the actual downstream water quality at a point below the St. Louis Ponds and all other discharges.

For those parameters in Table 2 where data are not available, it is not appropriate to assume current water quality exceeds water quality standards. Moreover, it may be more appropriate to assess whether a parameter should be considered further in the analysis of the St. Louis Ponds discharge. This is supported by the evaluation of mine effluent which was part of EPA's development of the categorical standards for Ore Mining and Milling (40 CFR 440), and by effluent data from the mining industry in Colorado, which are relevant to this inquiry. For example, these sources indicate arsenic is not normally found in mine effluent with the exception of a single mine in the San Luis Valley. Chromium, selenium and nickel are not natural byproducts of mineralization and thus are not found in mine drainage. Mercury is not a naturally occurring substance in Colorado. Where it has been found, it has been related to historic placer mining operations. Mercury was used during the gold rush days to agglomerate the gold. The Rico area was not a placer mining area, and there is no evidence the Rico area is a source area for mercury.

Table 2 compares the highest single available values with the standard. This is more conservative than the approach used for the WQCD to determine if a segment is violating its standards. It is noted that the highest value reported for zinc is 178 ug/l, far below the value of 756 ug/l estimated by the WQA.

TABLE 2
Comparison of the Water Quality Standards for the Dolores River and the Current Ambient Water Quality Data Measured Downstream of All Discharges

Parameter	In-Stream Water Quality Standard[1]		Current Ambient Water Quality
Arsenic, Total Recoverable	Chronic	100 ug/l	No Available Data
Cadmium, Dissolved	Acute	7.4 ug/l	Range: 0.1 - 0.7 ug/l
	Trout	NA ug/l	
	Chronic	3.3 ug/l	
Trivalent Chromium, Total Recoverable	Acute	100 ug/l	No Available Data
Hexavalent Chromium, Dissolved	Acute	16 ug/l	No Available Data
	Chronic	11 ug/l	
Copper, Dissolved	Acute	22 ug/l	Below Detection Limit
	Chronic	14 ug/l	(DL = 10 ug/l)
Iron, Total Recoverable	Chronic	1000 ug/l	Range: 62 - 141 ug/l
Lead, Dissolved	Acute	112 ug/l	Below Detection Limit[2]
	Chronic	4.3 ug/l	
Manganese, Dissolved	Acute	3535 ug/l	Range: 48 - 269 ug/l
	Chronic	1953 ug/l	
Mercury, Total	Chronic	0.01 ug/l	No Available Data
Nickel, Dissolved	Acute	719 ug/l	No Available Data
	Chronic	80 ug/l	
Selenium, Dissolved	Acute	18.4 ug/l	No Available Data
	Chronic	4.6 ug/l	
Silver, Dissolved	Acute	4.9 ug/l	Below Detection Limit[2]
	Trout	NA ug/l	
	Chronic	0.77 ug/l	
Zinc, Dissolved	Acute	180 ug/l	Range: 36 - 178 ug/L
	Chronic	182 ug/l	

1) WQS calculated using the following value for Hardness as $CaCO_3$: 166 mg/l

2) Detection limits (DL) vary between sampling events. All DLs were below the respective WQSs for data analyzed for this table. The detection limit range for dissolved lead was 0.05 – 0.12 ug/l, and for dissolved silver it was 0.02 – 0.1 ug/l.

In further support that water quality violations will not occur, the current discharges from the St. Louis Ponds are higher in zinc than WLAs based solely on a mass balance at the discharge point. Table 3 compares the current discharge from the St. Louis Ponds and the WLAs developed by Atlantic Richfield. The table shows that the WLA would be 500 ug/l to 2080 ug/l lower than the current discharge from the ponds. Since the current discharge of zinc from the ponds does not result in a water quality standard violation, as noted in Table 2, then it is reasonable to assume a treated discharge will not cause a violation of the standard. Therefore, the zinc WLAs in Table 3 would be protective of the water quality.

TABLE 3
Comparison of Zinc Concentrations

Parameter	WLA for Scenario Assuming No Hydrologic Connection	WLA for Scenario Assuming a Hydrologic Connection	Current Discharge from the St. Louis Pond System
Acute Dissolved Zinc	910 ug/l	913 ug/l	Range 1410 ug/l to 2990 ug/l
Chronic Dissolved Zinc	1144 ug/l	1147 ug/l	Range 1410 ug/l to 2990 ug/l

In addition, the methodology for derivation of the assimilative loadings and contributions shown in Table A-2 of the WQA cannot be gleaned from the spreadsheet provided by the WQCD. For example, the background contributions, the St. Louis Ponds contribution or the Columbia Tailings Seep contribution values are not presented in the spreadsheets.

Atlantic Richfield's July sampling of the discharges and receiving stream (during a very low flow, drought condition) should provide a more comprehensive, actual data set to confirm the significance of the discharges on the Dolores River water quality for all constituents. Appropriate detection limits will be used to allow a comparison with some of the lower standards. We hope this data will be used more directly in the revised WQA to be more representative of the site conditions, compared to the indirect approach taken in the current draft WQA.

9. Antidegradation

Atlantic Richfield believes that the antidegration requirements do not apply to this discharge. The requirements do not apply because:

1.) The St. Louis Ponds discharge, as well as discharges from the historic adits and seeps, currently exist. These are not new or expanded discharges and therefore antidegradation requirements should not apply.

2.) Additionally, as noted in Table 3, treating of the St. Louis Ponds discharge will result in a reduction in loading to the stream for parameters that can be treated, not an increase.

Proposed Approach

As noted in the preceding comments, Atlantic Richfield has identified significant flaws with the methods used in the WQA. These methods try to account for all of the background allocations between the discharge points of the adits and seeps. We hope based on our past conversations that the WQCD would agree there is not sufficient data to determine reasonable estimates for these loads. This is due primarily to the lack of data points and that the existing data for all sites and discharge points do not always correspond to one another in time. Of particular concern is the lack of information on the impacts, if any, of the historic adits and seeps on Silver Creek. Atlantic Richfield believes, based on all available information, that all the influences on Silver Creek cannot be currently defined. Atlantic Richfield therefore recommends that the load allocations for Argentine Seep, Blaine Adit and the background be recognized as part of the overall Silver Creek load contribution. The Silver Creek load contribution would be determined using water quality and flow data collected at the mouth of Silver Creek. This would negate the need to further analyze the hardness or the adit/seep flows. The assimilative capacity for the Dolores River would then be assessed based on the upstream water quality in the Dolores River, the St. Louis WLA (calculated by subtracting the background from the assimilative capacity, not adjusted for downstream contributions), the Silver Creek load contribution, load contributions from the Rico Boy, Santa Cruz and Silver Swan Adits, the load contribution from the Columbia Tailings Seep and background inputs below Silver Creek. The data used to calculate these would be those established in the WQCD's spreadsheet described as the current loadings. WLAs would not be used for the adits and seeps other than for St. Louis Ponds discharge. Actual load contributions will better represent the water quality in the Dolores River. In addition, the load contributions from the wetlands instead of the adit discharges would be used.

Atlantic Richfield applied this approach to the data in the WQCD's WQA. The accompanying Excel worksheet provides a preliminary assessment using this approach. A copy of a page from the spreadsheet (identified as "Load Allocation Spreadsheet") is provided in the appendix and an electronic copy can be made available upon request. Table 4 summarizes the results of this approach.

TABLE 4
Summary Remaining Assimilative Capacity

Parameter	Assimilative Capacity Remaining in the Dolores River after Silver Swan assuming adits discharge directly	Assimilative Capacity Remaining in the Dolores River after Silver Swan using "Current" quality of wetland discharges
As, Trec acute lbs/day	NA	NA
As, Trec chronic lbs/day	0.2902	0.3220
Cd, Dis acute lbs/day	-0.0312*	0.0006
Cd, Dis chronic lbs/day	-0.0251*	0.0067
Cr+3, Trec acute lbs/day	NA	NA
Cr+3, Trec chronic lbs/day	0.2999	0.3317
Cr+6, Dis acute lbs/day	-0.0181*	0.0137
Cr+6, Dis chronic lbs/day	-0.0084*	0.0234
Cu, Dis acute lbs/day	0.0016	0.0334
Cu, Dis chronic lbs/day	0.0142	0.0460
CN, Free acute lbs/day	-0.0359*	-0.0041*
Fe, Trec chronic lbs/day	19.1444	19.1762
Pb, Dis acute lbs/day	0.0678	0.0996
Pb, Dis chronic lbs/day	-0.0195*	0.0123
Mn, Dis acute lbs/day	10.7921	10.8239
Mn, Dis chronic lbs/day	13.5054	13.5372
Hg, Tot chronic lbs/day	-0.0440*	-0.0122*
Ni, Dis acute lbs/day	0.6349	0.6667
Ni, Dis chronic lbs/day	0.1643	0.1961
Se, Dis acute lbs/day	-0.0059*	0.0259
Se, Dis chronic lbs/day	-0.0183*	0.0135
Ag, Dis acute lbs/day	-0.0359*	-0.0041*
Ag, Dis chronic lbs/day	-0.0355*	-0.0037*
Zn, Dis acute lbs/day	0.2750	0.3068
Zn, Dis chronic lbs/day	0.6287	0.6605

* Negative values indicate that the assimilative capacity has been exceeded

Overall, assimilative capacities are not being exceeded except for cyanide, mercury and silver when using the contributions from the wetlands. For these parameters, limited data are available, usually a single sample which is at the detection limit. As a result, data for these parameters are very questionable and should not be used. This is also true of hexavalent and trivalent chromium and selenium. This explains why the calculations for these parameters indicate the assimilative capacities are exceeded. Additional monitoring could be done to better define the levels of these parameters. It should be noted that none of these parameters are thought to be present in the discharges. The remaining assimilative capacities compare reasonably with the observed in-stream water quality and the existing data, which shows that the segments are meeting standards. This evaluation shows that the assimilative capacity for zinc is not exceeded when using the unadjusted WLA for the St. Louis Ponds during the lowest flow season. (In the WQA, the WLAs were adjusted to account for downstream loadings from adits, seeps and calculated backgrounds. The above reference to an "unadjusted" WLA means that the WLA was calculated strictly by subtracting the upstream background from the assimilative capacity.) The additional data collected this year should be evaluated to determine whether a seasonal assessment can be achieved using this approach.

Summary

Due to the aforementioned concerns with the draft WQA, Atlantic Richfield proposes that one of these two suggestions be implemented:

1) ***Use Unadjusted St. Louis Pond WLA:*** The analysis discussed above ("Proposed Approach") shows that there are no present or reasonably anticipated future water quality impacts from the St. Louis Ponds discharge. Thus, effluent limitations for the ***St. Louis Pond*** discharge may be based on the seasonal limitations derived using this modified version of the WQCD's WQA. These limitations, as calculated using the current data, are shown in Table 5.

2) ***Revise the WQA***. Alternatively, the WQA would need to be revised as discussed above. This would involve:

    a) Modification of the method used to determine the adit and seep discharge flows and the low flows of the Dolores River and Silver Creek. This would involve the establishment of a ratio unless low flow data is gathered.

    b) Correction of the hardness values and establishment of a single standard per segment;

    c) Using the actual water quality data for the historic adits and seeps (including water quality data collected this summer during extreme low flow conditions);

    d) Using the actual quality of the discharge from the tributary wetlands; and

    e) Using the proposed discharge flows for the St. Louis Ponds.

1) We believe that additional monitoring data covering a year or more would be necessary to be able to make these revisions. The new data to be collected this summer during very low flow conditions should be used in the revised WQA and to "reality-check" the results of the WQA by comparing the discharge concentrations and loadings directly with actual low flow water quality of the Dolores River. As the low flow data is gathered this summer, these limitations may be refined to better represent the true water quality of the Dolores River during low flow conditions.

TABLE 5
WQA Results for the St. Louis Ponds

Parameter	St. Louis Ponds System WLA (Jan-Mar) lbs/day	St. Louis Ponds System WLA (Apr-Sep) lbs/day	St. Louis Ponds System WLA (Oct-Dec) lbs/day	St. Louis Ponds Limits (Jan-Mar) mg/l	St. Louis Ponds Limits (Apr-Sep) mg/l	St. Louis Ponds Limits (Oct-Dec) mg/l
As, Trec chronic	3.223	7.034	3.277	0.231	0.371	0.222
Cd, Dis acute	0.203	0.516	0.203	0.015	0.027	0.014
Cd, Dis chronic	0.099	0.213	0.101	0.007	0.011	0.007
Cr+3, Dis acute	24.297	62.407	24.297	1.743	3.294	1.645
Cr+3, Dis chronic	3.715	8.109	3.777	0.267	0.428	0.256
Cr+3, Trec chronic	3.214	7.010	3.268	0.231	0.370	0.221
Cr+6, Dis acute	0.440	1.130	0.440	0.032	0.060	0.030
Cr+6, Dis chronic	0.356	0.777	0.362	0.026	0.041	0.024
Cu, Dis acute	0.595	1.521	0.595	0.043	0.080	0.040
Cu, Dis chronic	0.440	0.956	0.448	0.032	0.050	0.030
CN, Free acute	0.137	0.353	0.137	0.010	0.019	0.009
Fe, Trec chronic	16.386	30.723	17.323	1.176	1.622	1.173
Pb, Dis acute	3.148	8.077	3.149	0.226	0.426	0.213
Pb, Dis chronic	0.128	0.275	0.131	0.009	0.015	0.009
Mn, Dis acute	92.054	232.455	92.446	6.605	12.271	6.259
Mn, Dis chronic	55.927	119.621	57.186	4.013	6.315	3.872
Hg, Tot chronic	0.00032	0.00071	0.00033	0.00002	0.00004	0.00002
Ni, Dis acute	20.248	52.003	20.249	1.453	2.745	1.371
Ni, Dis chronic	2.638	5.754	2.682	0.189	0.304	0.182
Se, Dis acute	0.497	1.272	0.498	0.036	0.067	0.034
Se, Dis chronic	0.138	0.298	0.141	0.010	0.016	0.010
Ag, Dis acute	0.135	0.342	0.135	0.010	0.018	0.009
Ag, Dis chronic	0.019	0.039	0.019	0.001	0.002	0.001
Zn, Dis acute	4.920	12.529	4.931	0.353	0.661	0.334
Zn, Dis chronic	5.802	12.600	5.907	0.416	0.665	0.400

WLAs were calculated by subtracting the background loading from the assimilative capacity, they were not adjusted for downstream loadings.

Appendix: Compiled Flow Data

Table A-1. Sources Used to Compile Flow Data

Filename	Description
55052.tif	Rico Site Remediation Project, Surface Water Monitoring Program Post-VCUP Final Report, faxed by Bill Kelly to Pat Nelson, 4-29-02
55875.tif	Upper Dolores River Water Quality and Discharge, Rico, CO, faxed by Bill Kelly to Pat Nelson, 4-10-02
Arco mod.xls	RICO HISTORICAL SURFACE WATER QUALITY DATA 1984
Flow Sources for Arco.xls	Flow Data for Silver Swan, Santa Cruz, Rico Boy Adits, Argentine Seep, and Blaine Adit
S_swan.xls	SILVER SWAN ADIT: HISTORICAL & RECENT SURFACE WATER QUALITY DATA; all years
Sc_tail.xls	SILVER CREEK TAILINGS POND/SEEPAGE: HISTORICAL & RECENT SURFACE WATER QUALITY DATA: all years
St_cruz.xls	SANTA CRUZ ADIT: HISTORICAL & RECENT SURFACE WATER QUALITY DATA: all years
wqreport2001	UPPER DOLORES RIVER AND SILVER CREEK BASIN WATER QUALITY AND DISCHARGE MONITORING SUMMARY, Rico, CO

Table A-2. Rico Boy Adit Flows

Rico Boy Adit Discharge Flows (DR-16-SW*)

Date	Jan-Mar (gpm)	Jan-Mar (cfs)	April-Sep (gpm)	April-Sep (cfs)	Oct-Dec (gpm)	Oct-Dec (cfs)	Source
9/15/92			9				55052.tif, page 8
10/18/95					2.5		
1/22/95	2						
4/24/96			1.3				
*Dolores River Corridor Remediation Completed in October 1996							
10/23/96					4		
1/22/97	3.5						
4/16/97			6.7				
7/30/97			4.5				
10/27/97					4.5		
1/13/98	5						
4/14/98			5.8				
7/9/98			5				
Count	**3**		**6**		**3**		
Average Flow (gpm)	**3.5**		**5.4**		**3.7**		

Table A-3. Santa Cruz Adit Flow

Santa Cruz Adit Discharge Flows (DR-8-SW)

	Jan-Mar		April-Sep		Oct-Dec		Source
Date	(gpm)	(cfs)	(gpm)	(cfs)	(gpm)	(cfs)	55052.tif, page 9
10/31/80					22		55052.tif, page 9
11/20/80					22		55052.tif, page 9
12/17/80					22		55052.tif, page 9
1/21/81	36						55052.tif, page 9
2/23/81	36						55052.tif, page 9
3/23/81	27						55052.tif, page 9
4/23/81			36				55052.tif, page 9
5/11/81			36				55052.tif, page 9
6/1/81	13						55052.tif, page 9
6/22/81			13				55052.tif, page 9
7/14/81			27				55052.tif, page 9
9/11/81			27				55052.tif, page 9
10/8/81					22		55052.tif, page 9
6/16/81			15				55052.tif, page 9
6/12/83			4.5				55052.tif, page 9
9/22/83			0.58				55052.tif, page 9
6/1/95			50				55052.tif, page 9
10/17/95					14		55052.tif, page 9
1/22/96	7.1						55052.tif, page 9
4/25/96			49.4				55052.tif, page 9
*Dolores River Corridor Remediation Completed in October 1996							
10/23/96					8		55052.tif, page 9
10/23/96					8.13		FlowSourcesForArco.)
1/22/97	14.7						FlowSourcesForArco.)
1/22/97	15						55052.tif, page 9
4/16/97			36				55052.tif, page 9
7/30/97			27				55052.tif, page 9
10/27/97					46		55052.tif, page 9
1/13/98	15						55052.tif, page 9
4/14/98			15				55052.tif, page 9
7/9/98			57				55052.tif, page 9
10/29/80					22.4	0.05	St_cruz.xls, sheet 1
11/18/80					22.4	0.05	St_cruz.xls, sheet 1
12/15/80					22.4	0.05	St_cruz.xls, sheet 1
1/19/81	35.9	0.08					St_cruz.xls, sheet 1
2/25/81	35.9	0.08					St_cruz.xls, sheet 1
3/26/81	26.9	0.06					St_cruz.xls, sheet 1
4/21/81			35.9	0.08			St_cruz.xls, sheet 1
5/12/81			35.9	0.08			St_cruz.xls, sheet 1
6/2/81			13.5	0.03			St_cruz.xls, sheet 1
6/24/81			13.5	0.03			St_cruz.xls, sheet 1
7/16/81			26.9	0.06			St_cruz.xls, sheet 1
8/11/81			336.6	0.75			St_cruz.xls, sheet 1
9/9/81			26.9	0.06			St_cruz.xls, sheet 1
10/7/81					22.4	0.05	St_cruz.xls, sheet 1
6/16/82			14.8	0.033			St_cruz.xls, sheet 1
6/12/83			4.5	0.01			St_cruz.xls, sheet 1
9/22/83			0.6	0.0013			St_cruz.xls, sheet 1
Count	**11**		**24**		**12**		
Average Flow (gpm)	**23.9**		**37.6**		**21.2**		

Table A-4. Silver Swan Adit Flows

Silver Swan Adit Discharge Flows (DR-7-SW)

	Jan-Mar		April-Sep		Oct-Dec		Source
Date	(gpm)	(cfs)	(gpm)	(cfs)	(gpm)	(cfs)	
10/30/80					22		55052.tif, page 15
11/20/80					45		55052.tif, page 15
12/17/80					45		55052.tif, page 15
1/21/81	31						55052.tif, page 15
2/23/81	36						55052.tif, page 15
3/23/81	45						55052.tif, page 15
4/22/81			67				55052.tif, page 15
5/11/81			54				55052.tif, page 15
6/1/81			27				55052.tif, page 15
6/24/81			27				55052.tif, page 15
7/14/81			27				55052.tif, page 15
8/12/81			18				55052.tif, page 15
9/11/81			22				55052.tif, page 15
10/7/81					27		55052.tif, page 15
6/16/82			72				55052.tif, page 15
3/17/83	99						55052.tif, page 15
6/12/83			193				55052.tif, page 15
9/22/83			144				55052.tif, page 15
8/12/91			0				55052.tif, page 15
7/14/92			1.8				55052.tif, page 15
9/15/92			51				55052.tif, page 15
6/1/95			50				55052.tif, page 15
10/17/95					18		55052.tif, page 15
1/24/96	13						55052.tif, page 15
4/24/96			49				55052.tif, page 15
10/23/97					10.7		FlowSourcesForArco.xls, sheet 1
7/31/97			135				FlowSourcesForArco.xls, sheet 1
7/31/97			140				55052.tif, page 15
10/27/97					9		55052.tif, page 15
1/13/98	20						55052.tif, page 15
4/14/98			40				55052.tif, page 15
7/9/98			27				55052.tif, page 15
Count	**6**		**19**		**7**		
Average Flow (gpm)	**40.7**		**60.3**		**25.2**		

Table A-5. Dolores River Downstream of Silver Swan Adit

Dolores River (downstream of Silver Swan Adit) Flows (DR-4-SW*)

	Jan-Mar		April-Sep		Oct-Dec		Source
Date	(gpm)	(cfs)	(gpm)	(cfs)	(gpm)	(cfs)	55052.tif, page 18
29-Oct-80					16158	36	
18-Nov-80					9425	21	
12-Dec-80					8079	18	
19-Jan-81	12567	28					
25-Feb-81	7630	17					
26-Mar-81	5386	12					
22-Apr-81			41741	93			
13-May-81			48025	107			
03-Jun-81			193446	431			
24-Jun-81			46678	104			
16-Jul-81			76301	170			
12-Aug-81			31867	71			
11-Sep-81			30969	69			
05-Oct-81					39946	89	
14-Apr-82	60592	135					
14-Oct-82					31418	70	
17-Mar-83	13465	30					
08-Sep-93			26930	60			
17-Oct-95					17056	38	
23-Apr-96			31867	71			
*Dolores River Corridor Remediation Completed in October 1996							
24-Oct-96					17504	39	
18-Apr-97			31418	70			
30-Jul-97			117593	262			
29-Oct-97					26032	58	
15-Apr-98			21095	47			
07-Jul-98			85278	190			
Count	**5**		**13**		**8**		
Average Flow (gpm)	**19928**		**60247**		**20702**		